

AUTOMATIC SUTURE FIXATION APPARATUS AND METHOD  
FOR MINIMALLY INVASIVE CARDIAC SURGERY

ABSTRACT OF THE DISCLOSURE

An apparatus for automatically fixing sutures used in the surgical replacement of a heart valve, includes a first cylinder having a first end and a second end and an interior surface and an exterior surface and a valve sleeve including an annular cuff surrounding the exterior surface adjacent to the first end of the first cylinder. An annular lip is formed on the exterior surface adjacent to the second end of the first cylinder, and a replacement heart valve is positioned within the valve sleeve. The apparatus further includes a second cylinder having second securing means formed on an interior surface of the second cylinder, such that the second securing means corresponds to and are adapted to fixedly engage the first securing means. The invention further includes a method for automatically fixing sutures to secure a valve sleeve including an annular cuff and a replacement heart valve to an annulus formed in a patient's heart. The method includes the steps of positioning the annular cuff of the valve sleeve in the annulus and securing the cuff to the annulus with sutures, threading the sutures over an exterior surface of a first cylinder and over an interior surface of a second cylinder; applying pressure against the first cylinder and tension to the sutures to ensure a blood-tight seal between the cuff of the valve sleeve and the annulus; and securing the sutures between the first cylinder and the second cylinder.